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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,105	12/21/2001	Xiaoyun Zhu	10013755 -I	5883

7590 10/06/2006

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
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EXAMINER

GEREZGIHER, YEMANE M

ART UNIT	PAPER NUMBER
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2144

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/032,105

Applicant(s)

ZHU ET AL.

Examiner

Yemane M. Gerezgiher

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 18-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The response filed on 07/24/2006 has been entered. Claims 1-8 and 17-22 remain pending in this application.

Election/Restrictions

2. Applicant's election without traverse of group I (Claims 1-8 and 17-22) in the reply filed on 07/24/2006 is acknowledged. However, Examiner notes a **typographical error** when numbering the claims in groups I and II (See last office action, *Election/Restrictions*). Claim 17, which depends on claim 14 (now cancelled), is in fact part of the cancelled Claims 9-16.

Thus, claim 17 has been withdrawn from consideration as been directed to the non-elected (canceled) claims.

In reply to this office action, the inventive entity should formally cancel claim 17.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 4, 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 3, Claim Lines 3, 5 and 6, the inventive entity recite, "the number of edge switches, the number of rack switches, the number of server nodes..." There is insufficient antecedent basis. No *number of switches, servers* has been previously defined in the claim.

In Claim 4, Claim Lines 3 and 4, the inventive entity recite, "the number of application functional...the network traffic..." which lack antecedent basis. No *number of application functional components* and no *network* have been previously defined in the claim.

Claim 21, recite, "the organization..." (Claim 21, Claim Lines 2-3). There is insufficient antecedent basis. No *organization* has been previously defined in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-8 and 18-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Agarwal et al. (US 20030028642 A1) hereinafter referred to as Agarwal.

As per claim 1, Agarwal disclosed a resource assignment method [abstract] comprising: establishing a resource model [Abstract, Page 1, ¶¶0008-0014, Agarwal disclosed resource allocation having therein communication resources. Agarwal disclosed establishing a collection of resource models (server farm), see Page 2, ¶0027]; acquiring an application model [Agarwal disclosed hosting plurality of applications in a shared virtual server farm, see Page 2, ¶¶0026-0038]; and utilizing a mapping process to map said application model onto said resource model [Page 2, ¶0040 through Page 3, ¶0043, Agarwal disclosed mapping plurality of application models to appropriate resources in the virtual server farm. Agarwal disclosed determining the requirement of plurality of applications and based on the determined requirements allocating/mapping sufficient resources to each of the plurality hosted applications (Page 3, ¶¶0053-0055)], wherein said mapping process is directed to increasing the optimization of resource utilization through appropriate assignment of resources to an application with respect to desired objectives [Page 3, ¶¶0044-0048, ¶0052].

As per claim 2, Agarwal disclosed obtaining a set of parameters associated with topology and performance characteristics of resources in a data

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center [Page 3, ¶0054, Page 8, ¶¶0159-0161, Agarwal disclosed capacity of a machine to support a particular application is measured, Page 4, ¶0077-0078, Agarwal disclosed collecting performance metrics] and; acquiring information about resource requirements of an application [Page 3, ¶0053-0055, benchmarking, Page 4, ¶0076, and Page 6, ¶0126, Page 7, ¶¶0133-0134].

As per claim 3, Agarwal disclosed that said parameters that characterize the topology and resources of said data center include: the number of edge switches, the number of rack switches, the number of server nodes, and connectivity matrices between different layers; and specification of the bandwidth limits of the incoming and outgoing links at various layers of the network [Page 2, ¶¶0026-0039 and Page 3, ¶¶0048-54, Page 8, ¶¶0163-0165, Agarwal disclosed plurality resources including all conventional network elements and disclosed analyzing incoming and outgoing links rates associated with plurality of application models for purposes of optimal resource allocation to the plurality of applications].

As per claim 4, Agarwal disclosed a number of application functional components [Page 3, ¶0058]; the network traffic requirements between said application functional components [Page 2, 0040 and Page 3, ¶0048]; and upper and lower bounds on server attributes which are required for said server to host said application functional component [Page 3, ¶¶0053-0055, Page 2, ¶¶0040-0042].

As per claim 5, Agarwal disclosed mapping process determining which server nodes are assigned to an application functional component and is captured in an assignment decision variable [Abstract, "...record is maintained of the resources currently allocated and resources currently consumed for each combination of instance and user, in terms of load factors placed on the instances by requests serviced by those instances of the application or its components..." see also Page 6, ¶¶0111-0115].

As per claim 6, Agarwal disclosed that assignment decision variable is optimized in accordance with a desired objective including meeting application requirements [Page, 1, ¶¶0011-0015, Page 2, ¶0040 and Page 3, ¶0044].

As per claim 7, Agarwal disclosed that the desired objective further includes minimizing communication delays [Page 1, 0014 and Page 2, ¶0040, Agarwal disclosed dynamic resource allocation to plurality of hosted application involving load balancing and optimized resource allocation that meet application requirements].

As per claim 8, Agarwal disclosed a layered partitioning and pruning (LPP) process is utilized to find an application resource assignment optimal solution [Page, 13, ¶0280, Agarwal disclosed partitioning in optimizing the resource allocation process].

As per claim 18, Agarwal disclosed a resource allocation system [Abstract, Page 1, ¶¶0008-0014, Agarwal disclosed resource allocation system having therein communication resources. Agarwa disclosed establishing a collection of resource models (server farm), see Page 2, ¶0027]; comprising: a means for gathering information associated with available networked resources [Page 3, ¶0054, Page 8, ¶¶0159-0161, capability of a machine/resource to support a particular application is measured]; a means for extracting information associated with application functional components [Page 2, 0040 and Page 3, ¶0048]; and a means for assigning application functional components to said available networked resources in accordance with a resource allocation variable [Page 2, ¶0040 through Page 3, ¶0043, Agarwal disclosed mapping plurality of application models to appropriate resources in the virtual server farm. Agarwal disclosed determining the requirement of plurality of applications and based on the determined requirements allocating/mapping sufficient resources to each of the plurality hosted applications (Page 3, ¶0053-0055)].

As per claim 19, Agarwal disclosed allocating said available networked resources by maximizing said available networked resources identified in said resource allocation variable with respect to application constraints and desired objectives [Page, 1, ¶¶0011-0015, Page 2, ¶0040 and Page 3, ¶0044].

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As per claim 20, Agarwal further disclosed configuration and performance characteristics of said available networked resources [Page 3, ¶0054, Page 8, ¶¶0159-0161, Agarwal disclosed capacity of a machine to support a particular application is measured, Page 4, ¶0077-0078, Agarwal disclosed collecting performance metrics].

As per claim 21, Agarwal further disclosed organization and networked resource requirements of said application functional components [Page 3, ¶0053-0055, benchmarking, Page 4, ¶0076, and Page 6, ¶0126, Page 7, ¶¶0133-0134].

As per claim 22, Agarwal further disclosed a means for simplifying said assignment analysis by identifying infeasible networked resources and partitioning said available networked resources [Page, 13, ¶0280, Agarwal disclosed partitioning in optimizing the resource allocation process and on Page 13, ¶0284 and ¶0288, Agarwal further disclosed identifying “infeasible” (i.e. unused or exhausted resources and resources not properly functioning by reclaiming and further dynamically allocating available resources)].

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Kimbrel et al. (US 7085837 B2) entitled: "Dynamic resource allocation using known future benefits"
 - b. Aiken et al. (US 20020053011 A1) entitled: "Dynamic resource allocation scheme"
 - c. Cable et al. (US 6854013 B2) entitled: "Method and apparatus for optimizing network service"
 - d. Bansal et al. (US 6968323 B1) entitled: "Dynamic allocation and pricing of resources of web server farm"
 - e. Boland (US 6947987 B2) entitled: " Method and apparatus for allocating network resources and changing the allocation based on dynamic workload changes"
 - f. Forecast et al. (US 6230200 B1) entitled: "Dynamic modeling for resource allocation in a file server"
 - g. Gilbert. et al. (US 6771595 B1) entitled: "Apparatus and method for dynamic resource allocation in a network environment"
 - h. Clarisse et al. (US 6591290 B1) entitled: "Distributed network application management system"
 - i. Lumelsky et al. (US 6516350 B1) entitled: "Self-regulated resource management of distributed computer resources"
 - j. Urevig et al. (US 6154787 A) entitled: "Grouping shared resources into one or more pools and automatically re-assigning shared resources from where they are not currently needed to where they are needed"
 - k. Aman et al. (US 5881238 A) entitled: "System for assignment of work requests by identifying servers in a multisystem complex having a minimum predefined capacity utilization at lowest importance level"
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yemane M. Gerezgiher whose

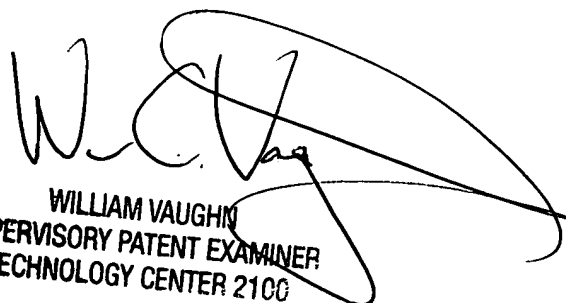
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telephone number is (571) 272-3927. The examiner can normally be reached on 9:00 AM - 6:00 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William C. Vaughn can be reached on (571) 272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Y. Gerezgifer
Examiner, CS


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